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EXAMINER	
BONANTO, GEORGE P	
ART UNIT	**PAPER NUMBER**
2855	

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/804,935	SCHUMACHER, MARK	
	Examiner	Art Unit	
	George P. Bonanto	2855	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 34-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 34-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/20/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6-8, 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 4,484,479 to Eckhardt.

As to claim 1, Eckhardt discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (cylindrical casing 12, Fig. 1) an electrical insulator on an inner wall of the vessel (plastic casing member 12 or metal casing with plastic surfaces; col. 1, lines 64-65) an electrode integral with the electrical insulator (electrode 14, Fig. 1) and a diaphragm that extends at least partially over the electrode and mates flush with the inner wall of the vessel and generally parallel with flow of process fluid through the vessel and that is configured to move relative to the electrode in response to the pressure of the process fluid (membrane 24, Fig. 1 and col. 2 lines 16-24) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2 lines 15-24).

As to claim 2, Eckhardt further discloses that the insulator and electrode extend partially around the inner wall of the vessel (tubular form, abstract, and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

As to claim 3, Eckhardt further discloses that the diaphragm extends partially around the inner wall of the vessel (membrane is in tubular form, col. 1 lines 14-15).

As to claim 6, Eckhardt further discloses that the insulator and electrode extend completely around the inner wall of the vessel (tubular form, abstract and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

As to claim 7, Eckhardt further discloses that the diaphragm extends completely around the inner wall of the vessel (membrane is in tubular form, col. 1 lines 14-15).

As to claim 8, Eckhardt further discloses a measurement circuit adapted to produce a pressure signal based on the electrical capacitance (capacitance measuring circuit C, Fig. 1 and col. 1 lines 25-32 and col. 1 line 67 to col. 2 line 6).

As to claim 11, Eckhardt further discloses that the diaphragm extends away from the inner wall into the process fluid (membrane 24 curves out from casing 12 into path of flow F, Fig. 1).

As to claim 12, Eckhardt further discloses that the diaphragm is flush with the inner wall of the vessel and the insulator and electrode are recessed into the inner wall (membrane 126 acts as inner wall of conduit, membrane is flush with inner wall electrode 114 is recessed into the wall, Fig. 2).

Claims 1, 4, 5, 10, and 13-19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Pat. No. 6,725,731 to Wiklund et al.

As to claim 1, Wiklund discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (pipe 12, Fig. 2) an electrical insulator on an inner wall of the vessel (fill fluid in cavities 42 and 44; Fig. 5) and electrode integral with

the electrical insulator and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in response to the pressure of the process fluid (capacitance-based differential pressure sensor, col. 4 lines 9-14, integral with restriction member which is part of the vessel wall, Fig. 10) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 4, lines 9-14).

As to claim 4, Wiklund et al. further disclose a temperature sensor integral with the inner wall to measure a fluid temperature and to generate a temperature signal indicative of the fluid temperature (col. 5, lines 41-49).

As to claim 5, Wiklund et al. further disclose processing electronics adapted to produce a pressure signal that is a function of the temperature signal (col. 5, lines 60-63).

As to claim 10, Wiklund et al. further disclose that the electrode and the diaphragm form a first capacitor (capacitance-based pressure sensor 102A, Fig. 10) a flow restrictive element extending from the inner wall of the vessel into the process fluid (restrictive member 20, Figs 2 and 10) and a second capacitor having a second electrode ad a second diaphragm that extends at least partially over the second electrode and that is configured to move relative to the second electrode in response to the pressure of the process fluid (capacitance-based pressure sensor 102B).

As to claim 13, Wiklund et al. disclose a differential pressure sensor for measuring a differential pressure of a process fluid in a conduit comprising a flow restriction element integral with an inner wall of the conduit adapted to produce a pressure drop when placed in-line with a fluid flow (restrictive member 20, Fig. 10, integral with inner wall of pipe 12, Fig. 2) a first electrical insulator integral with an inner wall of the conduit (fill fluid in cavities 42 and 44; Fig.

5) a first capacitor having a first capacitance and including a first electrode integral with the first electrical insulator and positioned upstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102A, the conduit being the pipe 12 and the restrictive member 20) a second capacitor having a second capacitance and including a second electrode integral with the second electrical insulator and positioned downstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102B, the conduit being the pipe 12 and the restrictive member 20) wherein the first capacitance and the second capacitance are related to the differential pressure of the process fluid (col. 6, lines 57-65).

As to claim 14, Wiklund further discloses processing electronics adapted to produce a flow rate signal that is indicative of a direction and a flow rate of the process fluid as a function of the first and second capacitances (col. 2, lines 31-37).

As to claim 15, Wiklund et al. further disclose that the first capacitor comprises a diaphragm that extends at least partially over the first electrode and that is configured to move relative to the first electrode in response to the pressure of the process fluid (capacitance-based pressure sensors 102A and B integral with inner wall of the conduit, Fig. 10) wherein the first capacitance is between the electrode and the diaphragm and is related to the pressure of the process fluid (col. 4, lines 11-14).

As to claim 16, Wiklund et al. further disclose that the flow restriction element has a narrow fluid flow passageway extending between symmetric first and second throat portions (Figs. 3B and 3C).

As to claim 17, Wiklund et al. further disclose a temperature sensor adapted to sense at least one of a temperature of the fluid flow and an operating temperature of the pressure sensor and to produce a temperature signal that is indicative of the sensed temperature (col. 5, lines 41-49).

As to claim 18, Wiklund et al. further disclose that a flow rate signal is a function of the temperature signal (col. 5, lines 60-63).

As to claim 19, Wiklund et al. further disclose that the first capacitor and the second capacitor extend at least partially around the inner wall of the conduit (conduit being the pipe 12 and the restrictive member 20, Fig. 10 and the capacitance-based pressure sensors 102A and B covering at least a part of the restrictive member 20, Figs. 2 and 10).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,484,479 to Eckhardt in view of Published U.S. Application No. 2005/0145018 by Sabata et al.

Eckhardt discloses a pressure sensor for measuring a pressure of a process fluid comprising a vessel for receiving the process fluid (cylindrical casing 12, Fig. 1) an electrode integral with an inner wall of the vessel (electrode 14, Fig. 1) and a diaphragm that extends at least partially over the electrode and that is configured to move relative to the electrode in

response to the pressure of the process fluid (membrane 24, Fig. 1 and col. 2 lines 16-24) wherein an electrical capacitance between the electrode and the diaphragm is related to the pressure of the process fluid (col. 2 lines 15-24). Eckhardt fails, however, to disclose a wireless transceiver for transmitting the pressure signal to a control system.

Sabata et al. disclose a wireless transceiver (paragraph 26) mounted to the inner wall of a vessel (paragraph 26 and Fig. 1) for the wireless transmission of a pressure signal to a control system (paragraph 25 and abstract).

It would have been obvious to one of ordinary skill in the art to include the wireless transceiver of Sabata et al. in the pressure sensor of Eckhardt in order to enable remote monitoring of the pressure in the pipe, which may be very long or inaccessible, such as buried for example, because the pressure signal may indicate a leak in the vessel (paragraph 25).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,725,731 to Wiklund et al. in view of U.S. Pat. No. 4,484,479 to Eckhardt.

As to claim 20, Wiklund et al. disclose a differential pressure sensor for measuring a differential pressure of a process fluid in a conduit comprising a flow restriction element integral with an inner wall of the conduit adapted to produce a pressure drop when placed in-line with a fluid flow (restrictive member 20, Fig. 10, integral with inner wall of pipe 12, Fig. 2) a first capacitor integral with the inner wall of the conduit and positioned upstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102A, the conduit being the pipe 12 and the restrictive member 20) a second capacitor integral with the inner wall of the conduit and positioned downstream from the flow restriction element and in-line with the process fluid (capacitance-based pressure sensor 102B, the conduit being the pipe

12 and the restrictive member 20) wherein a first capacitance and a second capacitance are related to a pressure of the process fluid (col. 6, lines 57-65). Wiklund et al. fail, however, to disclose that each of the first capacitor and the second capacitor extend entirely around the inner wall of the conduit.

Eckhardt discloses a capacitor that extends entirely around an inner wall of a conduit (tubular form, abstract, and electrode 14 existing both above and below membrane 24 with indications that electrode 14 is continuous, Fig. 1).

It would have been obvious to one of ordinary skill in the art to use the tubular capacitor of Eckhardt in the place of the first and second capacitors of Wiklund in order to obtain a pressure signal that is representative of the pressure throughout the conduit, thereby reducing the chance that the pressure signal is inaccurate due to local flow disturbances.

Claims 34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,484,479 to Eckhardt, as applied to claims 1 and 13 above in view of U.S. Patent No. 6,813,964 to Clark et al.

Eckhardt fails to explicitly disclose that the electrical insulator comprises glass.

Clark et al. disclose an electrode insulating material disposed in a pipe that comprises glass (first wall 66 comprised of glass; Fig. 10).

It would have been obvious to one of ordinary skill in the art to modify the differential pressure sensor of Eckhardt by including the glass insulating layer of Clark et al. in order to electrically insulate the electrode.

Claims 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,484,479 to Eckhardt, as applied to claims 1 and 13 above in view of U.S. Patent No. 5,505,092 to Kowalski.

Eckhardt fails to explicitly disclose that the electrical insulator comprises ceramic.

Kowalski discloses an electrode insulating material disposed in a pipe that comprises ceramic (cover 42; Fig. 1 is ceramic; col. 4, lines 14-15).

It would have been obvious to one of ordinary skill in the art to modify the differential pressure sensor of Eckhardt by including the ceramic insulating layer of Kowalski in order to electrically insulate the electrode.

Claims 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,725,731 to Wiklund et al., as applied to claims 1 and 15 above in view of U.S. Patent No. 6,038,961 to Filippi et al.

Wiklund et al. fail to explicitly disclose that the diaphragm is sealed to the vessel by a weld.

Filippi et al. disclose a diaphragm that is sealed to a vessel by a weld (flexible diaphragm 58 welded to surface 62; Fig. 2a and col. 3, lines 6-7).

It would have been obvious to one of ordinary skill in the art to modify the differential pressure sensor of Wiklund et al. by including the welded diaphragm of Filippi et al. in order to provide a flexible diaphragm that is securely attached to the vessel.

Response to Arguments

Applicant's arguments filed 20 October 2005 have been fully considered but they are not persuasive.

In response to the rejection of claims 1-3, 6-8, 11 and 12 under 35 U.S.C. 102(b), Applicant has amended claims 1, 2, 6, and 12 to include an insulator on an inner wall of the vessel. As discussed above, Eckhardt discloses an insulator on an inner wall of the vessel. Therefore, the claims, as amended, are rejected. Applicant argues that the electrode is particularly advantageous because without such an insulator the electrode would not be capable of holding a capacitance with the diaphragm. While Applicant's observation is correct, the argument does not distinguish the claims from the prior art. Even without explicit reference to the plastic insulating layer, the prior art would implicitly disclose an insulator since the device works by measuring a capacitance. If a capacitance exists then, as Applicant has noted, the electrode must be electrically insulated from the diaphragm.

In response to the rejection of claims 1, 4, 5, 10, 13-19, 21, 22, 25-28, and 31 under 35 U.S.C. 102(e), Applicant has cancelled claims 21, 22, 25-28, and 31 and has amended claims 1, 10, 13, and 15 to include an electrical insulator in the inner wall of a vessel. As discussed above, Wiklund et al. disclose an electrical insulator on the inner wall of a vessel. Therefore, the claims, as amended, are rejected. Applicant argues that Wiklund fails to disclose an electrical insulator on the inner wall of a vessel, but instead shows only a pressure sensor electrode in a separate plate. This argument is not persuasive because the claims do not include language limiting the interpretation of the structure of Wiklund et al. from reading on the claims. Specifically, the plate of Wiklund et al. is construed as being part of the vessel. Thus the electrode in the plate is an electrode in the wall of the vessel. Applicant further argues that Wiklund et al. fail to disclose that the diaphragm mates flush with the inner wall of the conduit and generally parallel with the flow. As discussed above, Fig. 5 of Wiklund et al. discloses

diaphragms mounted flush with the inner wall of the conduit (plate construed as part of conduit wall). Wiklund et al. further disclose that the restrictor can have alternate designs, such as shown in Fig. 14, where the diaphragms are mounted generally parallel with the flow. Thus, this argument is not persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George P. Bonanto whose telephone number is (571) 272-2182. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GPB

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